

What is Claimed is:

1. A shock absorber for absorbing shock energy generated by a vibrator positioned on a connecting plate, the shock absorber comprising:
 - 5 a column having an upper damper, a neck zone coupled with the connecting plate, a lower damper and a through hole located in the center of the column;
 - a support plate located below the lower damper for holding the column;
 - a cover plate positioned above and covered the upper damper; and
 - 10 a cylinder connected to the support plate via the through hole so as to secure the column and the vibrator with the support plate;
 - wherein the neck zone has at least one groove to reduce a contacting area between the neck zone and the connecting plate so as to reduce a horizontal vibration frequency of the column in a horizontal direction.
- 15 2. The shock absorber of claim 1, wherein the upper damper has a first recess, a first apex is formed on a first inmost position of the first recess, a second apex is formed on a second inmost position of the groove, and the second apex is staggered vertically from the first apex for adjusting a vertical vibration frequency of the column in a vertical direction.
- 20 3. The shock absorber of claim 1, wherein the lower damper has a second recess, a second apex is formed on a second inmost position of the groove, a third apex is formed on a third inmost position of the second recess, and the second apex is staggered vertically from the third apex for adjusting a vertical vibration frequency of the column in a vertical direction.
- 25 4. The shock absorber of claim 1, wherein the support plate is a base of a disc drive, and the vibrator is a rotary device of the disc drive.
5. The shock absorber of claim 1, wherein the connecting plate is a primary suspension plate.
- 30 6. A shock absorber for absorbing shock energy generated by a vibrator, the shock absorber comprising:
 - a column having an upper damper, a neck zone, a lower damper and a through hole located in the center of the column;

a support plate located below the lower damper for holding the column;

a cover plate located above and covered the upper damper; and

a cylinder connected to the support plate via the through hole;

wherein the upper damper has a first recess, a first apex is formed on a first
5 inmost position of the first recess, a second is formed on a second inmost position of
the neck zone, and the second apex is staggered vertically from the first apex for
adjusting a vertical vibration frequency of the column in a vertical direction.

7. The shock absorber of claim 6, wherein the shock absorber is positioned on a
connecting plate, the neck zone has at least one groove to reduce a contacting area
10 between the neck zone and the connecting plate so as to reduce a horizontal
vibration frequency of the column in a horizontal direction.

8. The shock absorber of claim 7, wherein the second apex is located in the groove.

9. The shock absorber of claim 7, wherein the connecting plate is a primary suspension
plate.

10. The shock absorber of claim 6, wherein the lower damper has a second recess with a
third apex formed on a third inmost position of the second recess, and the second
15 apex is staggered vertically from the third apex for adjusting the vertical vibration
frequency of the column in the vertical direction.

11. The shock absorber of claim 6, wherein the support plate is a base of a disc drive,
20 and the vibrator is a rotary device of the disc drive.

12. A shock absorber for absorbing shock energy generated by a vibrator, the shock
absorber comprising:

a column having an upper damper, a neck zone, a lower damper and a through
hole located in the center of the column;

25 a support plate located below the lower damper for holding the column;

a cover plate located above and covered the upper damper; and

a cylinder connected to the support plate via the through hole;

wherein the upper damper has a first recess, the lower damper has a second
recess, a first apex is formed on a first position of the first recess, a second apex is
30 formed on a second inmost position of the neck zone, a third apex is formed on a third

inmost position of the second recess, and the second apex is staggered vertically from the third apex for adjusting a vertical vibration frequency of the column in a vertical direction.

5 13. The shock absorber of claim 12, wherein the shock absorber is positioned on a connecting plate, the neck zone has at least one groove to reduce a contacting area between the neck zone and the connecting plate so as to reduce a horizontal vibration frequency of the column in a horizontal direction.

14. The shock absorber of claim 13, wherein the second apex is located in the groove.

10 15. The shock absorber of claim 13, wherein the connecting plate is a primary suspension plate.

16. The shock absorber of claim 12, wherein the first apex is staggered vertically from the second apex for adjusting the vertical vibration frequency of the column in the vertical direction.

15 17. The shock absorber of claim 12, wherein the support plate is a base of a disc drive, and the vibrator is a rotary device of the disc drive.